DETAILED ACTION

1. This Office action for U.S. Patent Application 10/826,971 is responsive to communications filed 03 March 2009, in response to the Non-Final Rejection of 03 September 2008. Currently, Claims 1, 4, 5, 7–12, 14–22, 25–28, 31–33, 68, 69, 72, 73, and 76–98 are pending. Of those, Claims 77–98 are new.

2. In the previous Office action, Claims 1–5, 7–12, 14–21, 23, 24, 29, 30, and 68–70 were rejected under 35 U.S.C. 101 as non-statutory. Claims 1–5, 7–12, 14–33, and 68–76 were rejected under 35 U.S.C. 103(a) as obvious over U.S. Patent 4,420,771 (Pirsch) in view of U.S. Patent 5,668,547 A (Lee).

Response to Amendment

3. Applicant's amendments to claims 1 and 68 have been fully considered. The rejection of Claims 1 and 68 under 35 U.S.C. 101 is withdrawn.

Applicant's amendments to claims 77 and 84 have been fully considered. Since the specification never specifically recites a "physical storage medium", the claimed "one or more" media still are considered to encompass the claimed non-statutory transitory signal embodiments. It is suggested that the phrase "one or more computer-readable physical storage media" in claims 77 and 84 is amended to recite "a computer-readable memory storage medium".

Response to Arguments

4. Applicant's arguments filed with respect to the rejections under 35 U.S.C. 103 have been fully considered but they are not persuasive. Applicant argues that the Lee patent discloses run-length coding, in contrast with the claimed run-level coding. It is respectfully submitted that this arises from a misreading or misconception of the Lee reference. Applicant admits in page 15 of the Arguments that "the Lee patent looks at run-level pairs". The Lee patent describes conventional run-level coding in column 1: lines 43–57, and seeks to improve this coding by further encoding repeated lengths of runs. It appears that Applicant believes the values 1(1), 1(2), 1(3), etc. in column 4: lines 17–36 to be repeated instances of the value 1, not separate values. However, it is respectfully submitted that these values are the claimed "levels", or "single non-predominant value following a run of the predominant value".

To illustrate, consider the sequence: 1 0 0 0 3 0 0 0 0 2 0 0 0 0 5 0 0 0 0 5 2 0 0 0 6.

A first run-level coding produces: (0, 1), (3, 3), (4, 2), (4, 5), (4, 5), (2, 3), (6, 0)

Next, Lee determines if there are any repeated lengths of the runs of zeros. First, the sequence starts at 1, encoding 1 instance of 0 zeroes, followed by a value, or level, of 1, yielding (1, 0, 1). Next, there is a single run of 3 zeroes, followed by a 3, yielding (1, 3, 3). Next, there are three runs each of 4 zeroes, followed respectively by the values, or levels, 2, 5, 5, giving (3, 4, 2, 5, 5). Next, a 2 preceded by no zeroes, that is, one run of no zeroes, giving (1, 0, 2), and lastly, a single series of three zeroes, with

a six terminating, yielding (1, 3, 6). The final sequence is 1 0 1 1 3 3 3 4 2 5 5 1 0 2 1 3 6. In page 14 of the arguments, Applicant states that the value of 1 is a "run value" of the repeated runs, but this is instead the repeated length of the runs of the single predominant value 0, that is to say, the run in the secondary run level coding. The "runlength repetition index" of 5 is the claimed level in the secondary run level coding. In page 16, similarly, the n-tuple (2, 0, 1(6), 1(7)) does not describe a "run of length 2 with a value of 0" as argued, but instead two runs of length 0, that is to say, a run-level pair with run 0 and level 2.

Considering this, all claim rejections are maintained.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 77–98 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

The relevant portions of the USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Section IV.C, reads as follows:

> In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 2583-84, 32 USPQ2d at 1035.
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> Claims that recited nothing but the physical characteristics of a form of energy, such as a frequency, voltage, or the strength of a magnetic field, define energy or magnetism, *per se*, and as such are nonstatutory natural phenomena. See *O'Reilly*, 56 U.S. (15 How.) at 112-

> 114. Moreover, it does not appear that a claim reciting a signal encoded with functional descriptive material falls within any of the categories of patentable subject matter set forth in Sec. 101.
>
> …a signal does not fall within one of the four statutory classes of Sec. 101.
>
> …signal claims are ineligible for patent protection because they do not fall within any of the four statutory classes of Sec. 101.

Claims 77–98 are drawn to "one or more" "media" encoding functional descriptive material. The reference to the plural media in the claims connotes a networked embodiment of the claimed storage media, such as through the non-statutory transitory "communication" medium described in page 14: lines 22-28, despite the word "physical". A signal embodying functional descriptive material is neither a process nor a product (i.e., a tangible "thing") and therefore does not fall within one of the statutory classes of §101. Rather, a “signal” is a form of energy, in the absence of any physical structure or tangible material. See *In re Nuijten*, 84 USPQ2d 1495 (Fed. Cir. 2007, *en banc* denied 2008, *writ of cert. pending*). Because the full scope of the claims as properly read in light of the disclosure encompasses non-statutory subject matter, the claims as a whole are non-statutory. It is suggested that the phrase "One or more computer-readable physical storage media" in independent Claims 77 and 84 be replaced with the phrase "a computer-readable memory storage medium".

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. Claims 1, 4, 5, 7–12, 14–22, 25–28, 31–33, 68, 69, 72, 73, and 76–98 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent 4,420,771 (Pirsch), cited in the 17 March 2008 Information Disclosure Statement in view of US Patent 5,668,547 A (Lee). Pirsch teaches a run-level coder in which further variable-length coding is performed on runs and levels. Regarding independent claims 1 and 22, Lee performs coding on "frequent-value runs" of a pre-determined value and "non-frequent-value runs" of other values (column 1: lines 63-68). This corresponds with the claimed step of processing plural first-layer runs. The processed variable-length codes in Pirsch are then transmitted (column 2: lines 7-9), which corresponds with the claimed step of "outputting a result". However, as shown in tables 2-3 of Pirsch, although specific runs are given variable-length coding, these are not run-level codes themselves (column 7: lines 5-48).

Lee teaches an advanced run-length coding system for a digital video coder, such as the "processing tool" of claim 22. Regarding claim 1, Lee describes the use of run-level coding as a variable-length code of a sequence of data (column 1: lines 35-64), followed by an advanced method of further removing any remaining redundancy in the run-level coded data, such as from a repeated run, level pair (column 2: lines 5-34. By substituting the run-level coding system of Lee for the custom VLC tables of runs and levels of Pirsch, the present invention is achieved.

Pirsch discloses the claimed invention except for performing second-layer run-level coding on runs. Lee teaches that it was known to perform run-level coding as an

efficient variable-length coding technique and that it was known to further compress a first-layer run-level code. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the coding system of Lee into the coder of Pirsch, since Lee states in column 1: lines 58-63 that such a modification would "greatly reduce the amount of data" by performing run-level compression, while still eliminating further redundancies of run-level pairs.

Regarding claims 4 and 5, Lee operates on DCT blocks of pixels that have been zigzag scanned (column 1: lines 23-34).

Regarding claims 7, 25, and 26, in Pirsch, a distinction is made between "frequent" values, and "non-frequent" values (column 2: lines 26-49), and Lee shows that typically in video coding, a zero value is distinguished from non-zero values (column 1: lines 30-57). Pirsch additionally explicitly shows coding performed on runs of value zero, considered a "significant value" in the present invention (column 7: lines 5-35).

Regarding claim 8, Pirsch shows further variable-length coding of runs of value one (column 7: lines 5-24, 38-48), which is a non-zero, "insignificant" value.

Regarding claim 9, table 2 of Pirsch shows a unique code word for each length of a zero-value, or "significant-value" run.

Regarding claims 10, 11, 20, and 21, Pirsch teaches that it was known to perform Huffman coding on the output of run-level data (column 7: lines 49-54).

Regarding claim 12, the additional processing in Lee to reduce redundancies in run-level pairs (column 4: lines 12-43) corresponds with the claimed step of "processing a count of significant second-layer runs".

Regarding Claim 69, in Pirsch, the "transmission" of an encoded signal (column 2: line 8) corresponds with the claimed bit stream output signal.

Regarding Independent Claim 22, figure 2 of Pirsch illustrates a decoder that decodes the signal encoded in the encoder of figure 1.

Regarding Claims 25 and 26, in Pirsch, a distinction is made between "frequent" values, and "non-frequent" values (column 2: lines 26-49), and Lee shows that typically in video coding, a zero value is distinguished from non-zero values (column 1: lines 30-57). Pirsch additionally explicitly shows coding performed on runs of value zero, considered a "significant value" in the present invention (column 7: lines 5-35).

Regarding Claim 27, Pirsch shows further variable-length coding of runs of value one (column 7: lines 5-24, 38-48), which is a non-zero, "insignificant" value.

Regarding claim 72, in Pirsch, the "recovering" of an original signal (column 2: line 9) corresponds with the claimed reconstruction of video pictures for display.

Regarding Independent Claim 28, Pirsch describes performing processing on the "magnitudes or values or values of words which make up the non-frequent value runs",

including further variable-length coding (column 2: lines 1-3). This corresponds with the claimed step of "processing run-level information" in the present invention.

Regarding claim 31, the coded values of levels in Pirsch are the "non-frequent" values (column 2: line 2), which are considered non-zero or "insignificant" according to the present invention.

Regarding claim 32, in Pirsch, Table 3 shows a special coding for runs of a level of value one.

Regarding claim 33, in Pirsch, Table 4 shows a coding in which each "non-frequent value" has a unique coding.

Regarding claim 73, in Pirsch, the "transmission" of an encoded signal (column 2: line 8) corresponds with the claimed bit stream output signal.

Regarding claim 76, in Pirsch, the "recovering" of an original signal (column 2: line 9) corresponds with the claimed reconstruction of video pictures for display.

Regarding Independent Claim 68, figure 2 of Pirsch illustrates a decoder that decodes the signal encoded in the encoder of figure 1.

Regarding Claims 14 and 15, the coded values of levels in Pirsch are the "non-frequent" values (column 2: line 2), which are considered non-zero or "insignificant" according to the present invention.

Regarding claim 16, table 4 of Pirsch shows a unique code for each non-zero value.

Regarding claims 17 and 18, Pirsch teaches that it was known to perform Huffman coding on the output of run-level data (column 7: lines 49-54).

Regarding claim 19, the additional processing in Lee to reduce redundancies in run-level pairs (column 4: lines 12-43) corresponds with the claimed step of "processing a count of significant second-layer levels".

Regarding Independent claim 77, although Pirsch and Lee are directed to hardware implementations, the examiner takes Official Notice that it would have been obvious to one having ordinary skill in the art at the time of the present invention to implement a software variable-length coder or decoder for digital video, such as those found in common software implementations of standard video codecs such as the MPEG family or the H26x family.

Regarding Claim 78, in Pirsch, a distinction is made between "frequent" values, and "non-frequent" values (column 2: lines 26-49), and Lee shows that typically in video coding, a zero value is distinguished from non-zero values (column 1: lines 30-57). Pirsch additionally explicitly shows coding performed on runs of value zero, considered a "significant value" in the present invention (column 7: lines 5-35).

Regarding Claim 79, Pirsch shows further variable-length coding of runs of value one (column 7: lines 5-24, 38-48), which is a non-zero, "insignificant" value.

Regarding Claim 80, table 2 of Pirsch shows a unique code word for each length of a zero-value, or "significant-value" run.

Regarding Claims 81 and 82, Pirsch teaches that it was known to perform Huffman coding on the output of run-level data (column 7: lines 49-54).

Regarding Claim 83, the additional processing in Lee to reduce redundancies in run-level pairs (column 4: lines 12-43) corresponds with the claimed step of "processing a count of significant second-layer runs".

Regarding Independent Claim 84, figure 2 of Pirsch illustrates a decoder that decodes the signal encoded in the encoder of figure 1.

Regarding Claims 85 and 86, in Pirsch, a distinction is made between "frequent" values, and "non-frequent" values (column 2: lines 26-49), and Lee shows that typically in video coding, a zero value is distinguished from non-zero values (column 1: lines 30-57). Pirsch additionally explicitly shows coding performed on runs of value zero, considered a "significant value" in the present invention (column 7: lines 5-35).

Regarding Claim 87, Pirsch shows further variable-length coding of runs of value one (column 7: lines 5-24, 38-48), which is a non-zero, "insignificant" value.

Regarding Independent Claim 88, Pirsch describes performing processing on the "magnitudes or values or values of words which make up the non-frequent value runs", including further variable-length coding (column 2: lines 1-3). This corresponds with the claimed step of "processing run-level information" in the present invention.

Regarding Claim 89, the coded values of levels in Pirsch are the "non-frequent" values (column 2: line 2), which are considered non-zero or "insignificant" according to the present invention.

Regarding Claim 90, in Pirsch, Table 3 shows a special coding for runs of a level of value one.

Regarding Claim 91, in Pirsch, Table 4 shows a coding in which each "non-frequent value" has a unique coding.

Regarding Independent Claim 92, figure 2 of Pirsch illustrates a decoder that decodes the signal encoded in the encoder of figure 1.

Regarding Claims 93 and 94, the coded values of levels in Pirsch are the "non-frequent" values (column 2: line 2), which are considered non-zero or "insignificant" according to the present invention.

Regarding Claim 95, table 4 of Pirsch shows a unique code for each non-zero value.

Regarding Claims 96 and 97, Pirsch teaches that it was known to perform Huffman coding on the output of run-level data (column 7: lines 49-54).

Regarding Claim 98, the additional processing in Lee to reduce redundancies in run-level pairs (column 4: lines 12-43) corresponds with the claimed step of "processing a count of significant second-layer levels".

Conclusion

9. Due to the sensitive nature of the claims, the Examiner formally requests an interview prior to Applicant's response to this Office action.

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571)272-9662. The examiner can normally be reached on Monday-Friday from 10:00-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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